(ii) output temperature of the chamber of between 1150 and 1650°C,

(iii) pressure of the chamber of between 0.1 and 1.5 MPa,

and so that the output temperature of the chamber is adequate to convert at least 90% of the carbon of the feedstock into CO or CO2 and that the amount of soot contained in the effluent is less than 0.1% by weight relative to the feedstock,

e) cooling the effluent of the chamber is cooled (5) to a temperature of between 200°C and 1050°C,

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f) circulating the cooled effluent in at least one zone for recovery of hydrogen and treatment of soot, said zone comprising a first circuit (6) at least a first filter (7) and a second circuit (41) mounted in parallel; depositing soot in the first filter; regenerating the first filter containing the soot in the presence of a gas that contains oxygen, and concurrently circulating the cooled effluent the second circuit, said first filter having a filtration surface area/useful volume ratio between 80 and 5000 m^{-1}, and withdrawing a hydrogen-rich effluent from said at least one zone for recovery, and

g) feeding a fuel cell (10) with at least a portion of the withdrawn hydrogen-rich effluent from the recovery zone.

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5. (Amended) A process according to claim 1, wherein regeneration effluents of the first filter are drawn off from the first circuit.

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6. (Amended) A process according to claim 1, wherein the gaseous oxidant stream and/or the hydrocarbon feedstock contains water vapor in an H2O/hydrocarbon mass ratio of between 0.1 and 2.0.

7. (Amended) A process according to claim 1, further comprising measuring, the oxygen content of the effluent that exits the recovery zone.

8. (Amended) A process according to claim 1, further comprising conducting at least one at least partial elimination stage of the hydrogen sulfide and carbon monoxide of the effluent that is obtained from the recovery zone.

9. (Amended) A process according to claim 1, wherein the fuel cell is an electrolyte-type cell with solid oxide (SOFC).

10. (Amended) A process according to claim 1, wherein the fuel cell is a polymer electrolyte cell (PEMFC type) or a phosphoric acid cell.

11. (Amended) A process according to claim 1, further comprising adjusting the operating conditions of the partial oxidation zone during the regeneration periods of the first filter to reduce the amount of soot produced during said periods and circulating in the second circuit.

12. (Amended) A device for the production of electricity according to claim 1, comprising in combination:

a circuit (1) for feeding an air-rich oxidant stream that is connected to at least one heat exchanger (5) for the reheating of said stream,

at least one partial oxidation chamber that is connected to heat exchanger (5) and to a feed stream (2) of a hydrocarbon-rich stream for the partial oxidation of hydrocarbons for the reheated oxidant stream at an adequate temperature for obtaining a conversion of the hydrocarbons that is higher than 90% and the formation of soot in an amount that is less than 0.1% by weight relative to the hydrocarbons,

partial oxidation chamber (3) that is connected downstream to the exchanger,

soot recovery and treatment means that have an inlet connected to heat exchanger (5) and that comprise a first circuit (6) that comprises at least a first filter (7) and a second circuit (41) that are mounted in parallel, whereby the first filter also comprises regeneration means (20, 21) that are sequential by soot combustion, whereby the first filter has a filtration surface area/useful volume ratio of between 80 and 5000 m^{-1}, and whereby the recovery and treatment means have an outlet (9) for effluents from which soot has been removed and that are rich in hydrogen,

at least one fuel cell that is connected to the outlet of the effluents of the recovery and treatment means, suitable for producing electricity,

means for alternating use of soot recovery and treatment means (30, 31, 32, 35) that are connected to regeneration means of first filter (20, 21).

14. (Amended) A device according to claim 12, wherein the second circuit comprises a soot filter.

15. (Amended) A device according to claim 12, further comprising, means (50, 51, 52, 53) for clean-up of effluents inserted between the outlet of the soot recovery and treatment means and fuel cell (10).

Please add the following new claims:

--16. A process according to claim 1, wherein the operating pressure of the chamber is between 0.15 and 0.8 MPa, the amount of soot in the effluent is between 0.5 and 100 ppm, and the effluent is cooled to between 500 and 900°C.

17. A process according to claim 6, wherein the H_2O/hydrocarbon mass ratio is between 0.4 and 1.2.

18. Apparatus according to claim 12, wherein the first filter has a filtration surface area/useful volume ratio of between 150 and 1500^{m-1}.--